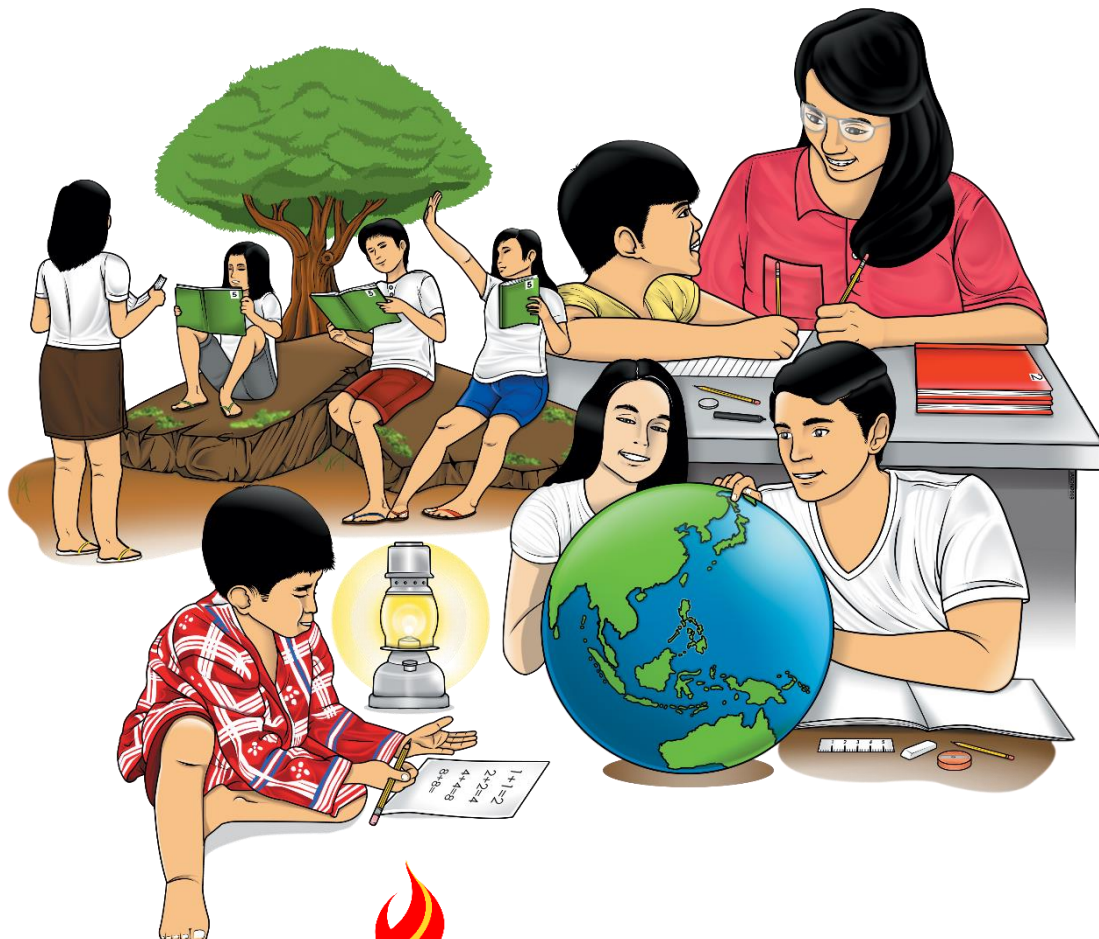**5**

Mathematics

Quarter 4 – Module 12:
Interpreting Data Presented in Different Kinds of Line Graphs (Single and Double-Line Graphs)

Mathematics – Grade 5
Alternative Delivery Mode
Quarter 4 – Module 12: Interpreting Data Presented in Different Kinds of Line Graphs
                        (Single and Double-Line Graphs)
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Mathematics
Quarter 4 – Module 12:
Interpreting Data Presented in Different Kinds of Line Graphs (Single and Double-Line Graphs)

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

Good day Mathletes! This module was designed and written to help you gain an understanding of and to test your ability in interpreting data presented in different kinds of line graphs. Remember that a line graph is a rectangular coordinate system consisting of the x and y axes.

Line graphs allows us to easily see changes in the values of the variables as well as trends, if there are any.

So, what are you waiting for? Stay focused and go.

At the end of this module, you are expected to be able to:

- identify the kinds of line graphs;
- appreciate the importance of line graph labels; and
- interpret data presented in different kinds of line graphs (single to double-line graph). **(M5SP-IVh-3.5)**

Before going any further, let us check your understanding of and your skills in interpreting data presented in different kinds of line graphs.

What I Know

Directions: Study the graph presented below.

Lito's and Lita's Incomes for the Day from Online Selling
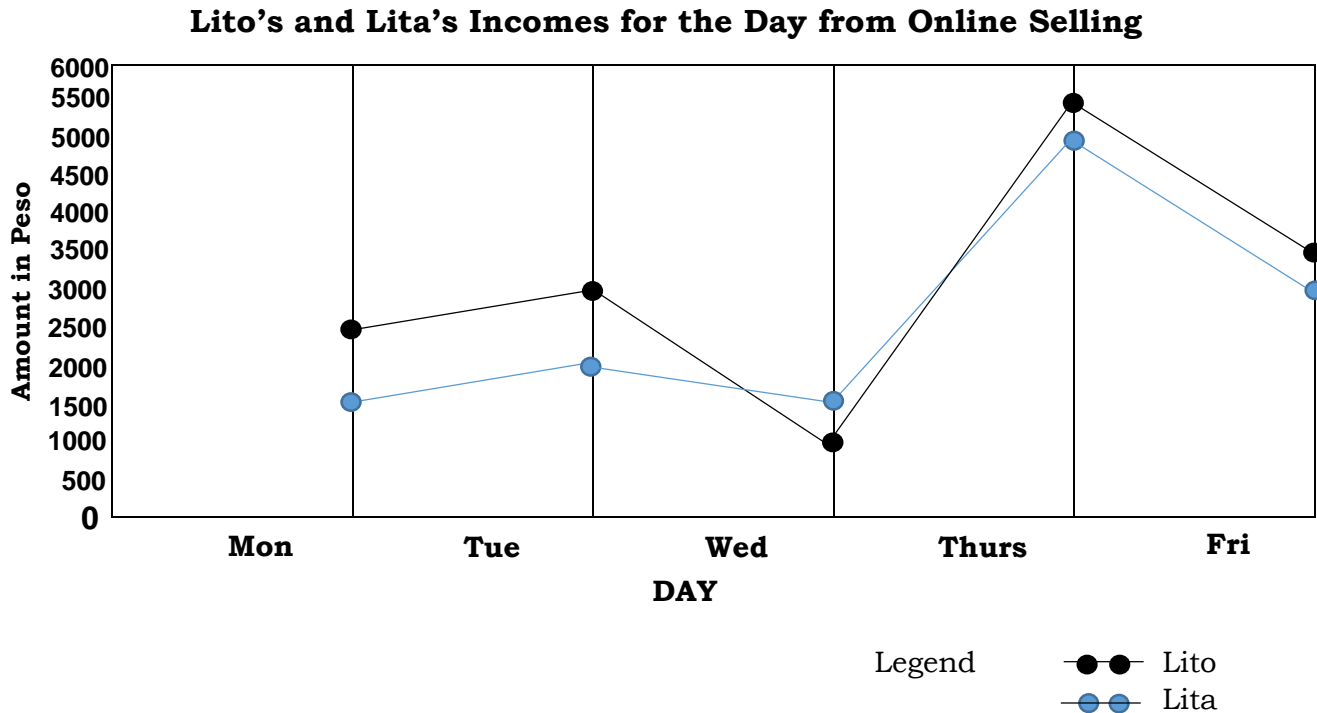
Answer the following questions using the data presented in the graph. Write your answers on a separate sheet of paper.

1. What is the title of the line graph?
   A. Lito's Income for the day from Online Selling
   B. Lita's Income for the day from Online Selling
   C. Lito's and Lita's Income for the day from Online Selling
   D. Lito's and Lita's Income for the day

2. What values are laid out along the y-axis?
   A. amounts in Peso
   B. days of the week
   C. Lito and Lita
   D. daily income

3. What values are laid out along the x-axis?
   A. Days
   B. amounts in Pesos
   C. income
   D. Lito and Lita

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4. How many points are plotted in the graph?
    A. 2
    B. 5
    C. 10
    D. 12

5. What kind of graph is shown above?
    A. Bar graph
    B. Single-line graph
    C. Double-line graph
    D. Pictograph

6. What was Lito's lowest income for the day for the five-day period?
    A. ₱ 1,000
    B. ₱ 2,000
    C. ₱ 3,000
    D. ₱ 2,500

7. On which day did Lito earn his highest income for the day for the five-day period?
    A. Wednesday
    B. Thursday
    C. Friday
    D. Tuesday

8. What was Lito's total income for the five-day period?
    A. ₱ 15,000
    B. ₱ 15,500
    C. ₱ 16,000
    D. ₱ 13,000

9. On which day/s did Lita earn the least?
    A. Monday and Tuesday
    B. Monday and Wednesday
    C. Monday and Thursday
    D. Wednesday only

10. What was the total combined income of Lito and Lita for the five-day period?
    A. ₱ 28,500
    B. ₱ 26,000
    C. ₱ 28,000
    D. ₱ 29,000

In order to interpret data presented in different kinds of line graphs, you need to be familiar with the various parts of line graphs – the title, the independent and dependent variables, the labels, and the plotted points. These will help you interpret and analyze the data.

In this module, you will learn how to interpret data presented in different kinds of line graphs. Are you ready?

What's In

In the previous lessons, you learned how to construct-a line graph. Recall the five steps in constructing a line graph. These are:

Step 1. Determine the independent and dependent variables.

Step 2. Draw the x and y axes and label them using the independent variable and dependent variables, respectively.

Step 3. Lay out the values of the independent variable along the x-axis and the values of the dependent variable along the y-axis, and draw the gridlines.

Step 4. Plot and connect the points.

Step 5. Write an appropriate title above the graph.

Let us refresh your memory. Answer the questions in the activity and use the data in the table below to construct a line graph. Write your answers on a separate sheet of paper.

Number of Sunflowers which Bloomed in Rosa's Garden

Week of Blooming	Number of Sunflowers which Bloomed
1	15
2	5
3	40
4	20
5	30

1. The independent variable is "Week of Blooming" and the dependent variable, "Number of Sunflowers which Bloomed".
2. Draw the x and y axes and use the independent and dependent variables to label them respectively.
3. Lay out along the x-axis the weeks in which the sunflowers bloomed – 1, 2, 3, and 4; and along the y-axis, the number of flowers which bloomed. The number of sunflowers which bloomed may indicated in intervals of 5, starting from 0 to 45.
4. Plot the points using the ordered pairs of the independent and dependent variables as coordinates and connect the points using line segments.
5. Write an appropriate title for the graph.

What's New

In the previous activity, Blooming Sunflowers in Rosa's Garden, you learned how to organize data in tables and present them in a line graph.

What if there are also sampaguita plants in Rosa's Garden? How would you present the other set of data in the same set of x and y axes or coordinate system? Do you know that your tabulated data can be presented and interpreted using different kinds of line graphs?

Let us try this next challenge which deals with different kinds of line graphs (single and double-line graphs).

The table below presents the data on flowers which bloomed in Rosa's Garden in particular weeks. Make a double line graph to present the two sets of data - the data showing the number of sunflowers which bloomed in particular weeks, and the number of sampaguita flowers which bloomed in those weeks.

Number of Flowers which bloomed in Rosa's Garden

Week of Blooming	Number of Sunflowers which Bloomed	Number of Sampaguita flowers which Bloomed
1	15	10
2	5	20
3	40	25
4	20	25
5	30	35

CO_Q4_Mathematics 5_ Module 12

In interpreting data presented in line graphs, you have to know what the variables are and understand what they mean or represent.

- The x-axis contains the values of the first or independent variable. Its values may refer to classes or categories, periods of time, etc. In our previous activity about the number of flowers which bloomed in Rosa's Garden, the variable refers to the weeks in which the flowers bloomed.

- The y-axis contains the values of the second or the dependent variable. As you go up the y-axis, the values are increasing. The variable may refer to any type of numerical data such as amounts of money, scores, number of people, temperature, grades etc. In our previous activity about the flowers blooming in Rosa's Garden, it represents the number of flowers which bloomed in a particular week.

Let us go back to the activity about the flowers in Rosa's Garden for us to better understand our lesson on double line graphs We will be constructing line graphs, one for the sunflowers and one for sampaguita flowers. In plotting the points and connecting these with line segments, we will use black for the sunflowers and blue for the sampaguita flowers.

Flowers in Rosa's Garden

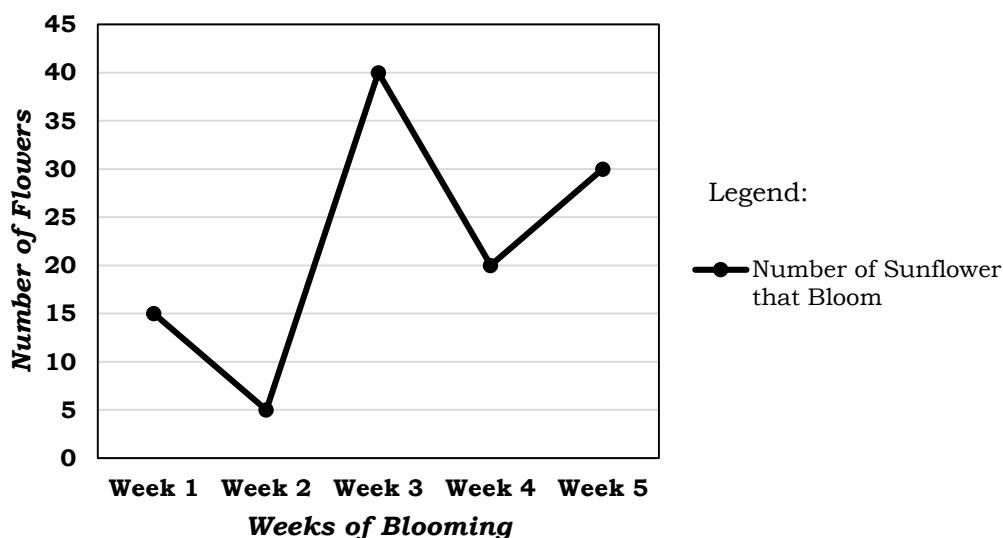| Weeks of Blooming	Number of Sunflowers which Bloomed	Number of Sampaguita which Bloomed
1	15	10
2	5	20
3	40	25
4	20	25
5	30	35

To construct a line graph for the data on the sunflowers, start by drawing the x and y axes. Label the x-axis with "Week of Blooming", the independent variable, and the y-axis with "Number of Flowers which Bloomed", the dependent variable.

Next, lay out the numbers 1 to 5 along the x-axis, the week in which the sunflowers bloomed. Then, lay out the numbers 0 to 45 in intervals of 5 along the y-axis.

Draw horizontal lines coinciding with the laid-out values along the y-axis. These lines will serve as guides when we plot the points later on. The pair of axes, properly labeled, with the values of the independent and dependent variables laid out is shown below.

Number of Flowers (y-axis: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45)

Week 1 Week 2 Week 3 Week 4 Week 5

Weeks of Blooming
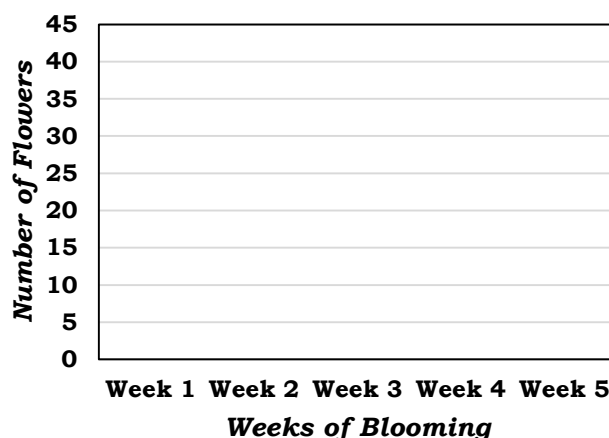
Next, plot the points to represent the data from the table. To do this, and using the data from the table, pair one value of the independent variable with the corresponding value of the dependent variable. You should then have these ordered pairs: (1,15), (2,5), (3,40), (4,20), (5,30). Using these pairs as coordinates, plot the points and connect them consecutively from left to right. The completed line graph is shown below.

Number of Flowers (y-axis: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45)

Week 1 Week 2 Week 3 Week 4 Week 5

Weeks of Blooming

Legend:

●—— Number of Sunflower that Bloom

In the same set of axes and following the same steps, make another line graph this time using the data on the number of sampaguita flowers which bloomed during the same 5-week period. Add a legend to inform readers which line graph is for which set of data.

Finally, write an appropriate title for the double-line graph. This final double line graph is shown below.

CO_Q4_Mathematics 5_ Module 12

Flowers in Rosa's Garden
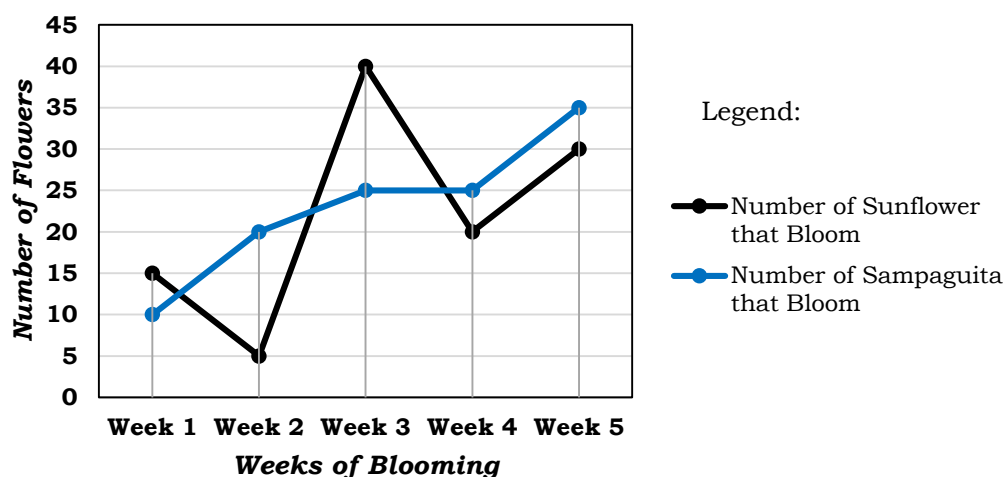
Looking at the graph for the sampaguita flowers, it is easy to see that the number of sampaguita flowers which bloomed was consistently increasing during the 5-week period. The total number of sampaguita flowers which bloomed during the period was 115.

On the other hand, the line graph for the sunflower shows that the number of sunflowers that bloomed peaked or was highest in week 3 From a high of 40 in week 3, it fell to 20 the following week. But it was up again the following week, to 30. The total number of sunflowers which bloomed during the period was 110.

All in all, there were 225 sampaguita flowers and sunflowers which bloomed in Rosa's Garden during the 5-week period.

Let us now try to interpret the data in the next double-line graph.

Pedro and Ana's Expenses in School

CO_Q4_Mathematics 5_ Module 12
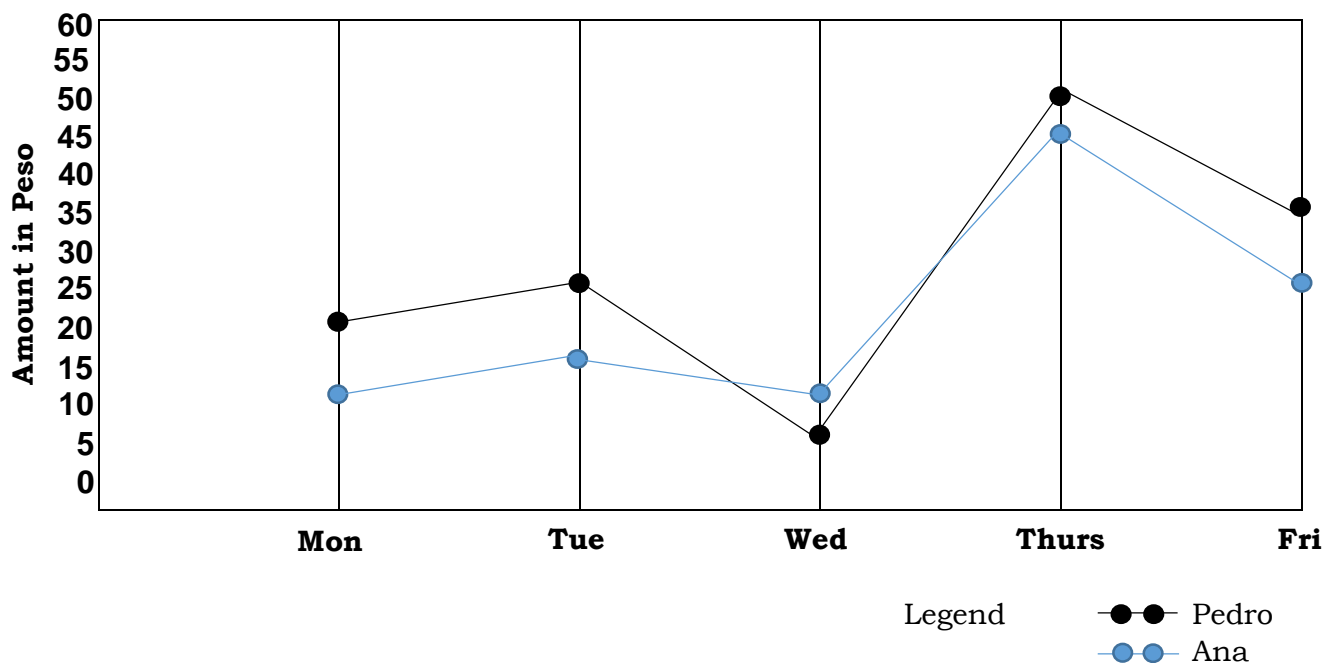
The line graphs show Pedro's and Ana's daily expenses in school. The legend at the bottom right of the line graph tells us that the graph in black refers to Pedro's expenses; the one in blue to Ana's.

Study the double-line graph and answer the following questions.

1. What do you think would be an appropriate title for the graph?
   Based on the given data, "Pedro's and Ana's Daily Expenses in School" would be an appropriate title for the graph.

2. What does the scale in the y-axis represent?
   The y-axis represents the amount of Pedro's and Ana's expenses in school in pesos.

3. On which day/s was Ana's expenses in school higher than Pedro's?
   Ana's expenses in school was higher than Pedro's on Wednesday.

4. What is the difference between their Friday expenses in school?
   The difference between their Friday expenses in school is 10 pesos.

5. Who had less expenses in school for the five days? Explain.
   Ana had less expenses in school than Pedro.

6. What is the difference between their total expenses in school for the five days?
   The difference in their total expenses is 30 pesos.

   Solutions for questions 5 and 6

   For number 5,

   Add all of Pedro's expenses from Monday to Friday

   Pedro's total expenses = ₱20 + ₱25 + ₱5 + ₱50 + ₱35 = ₱135

   Add all Ana's expenses from Monday to Friday

   Ana's total expenses = ₱10 + ₱15 + ₱10 + ₱45 + ₱25 = ₱105

   Ana had less expenses compared to Pedro.

   For number 6,

   Subtract Ana's total expenses from Pedro's

   ₱135 – ₱105 = ₱ 30
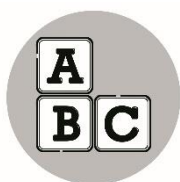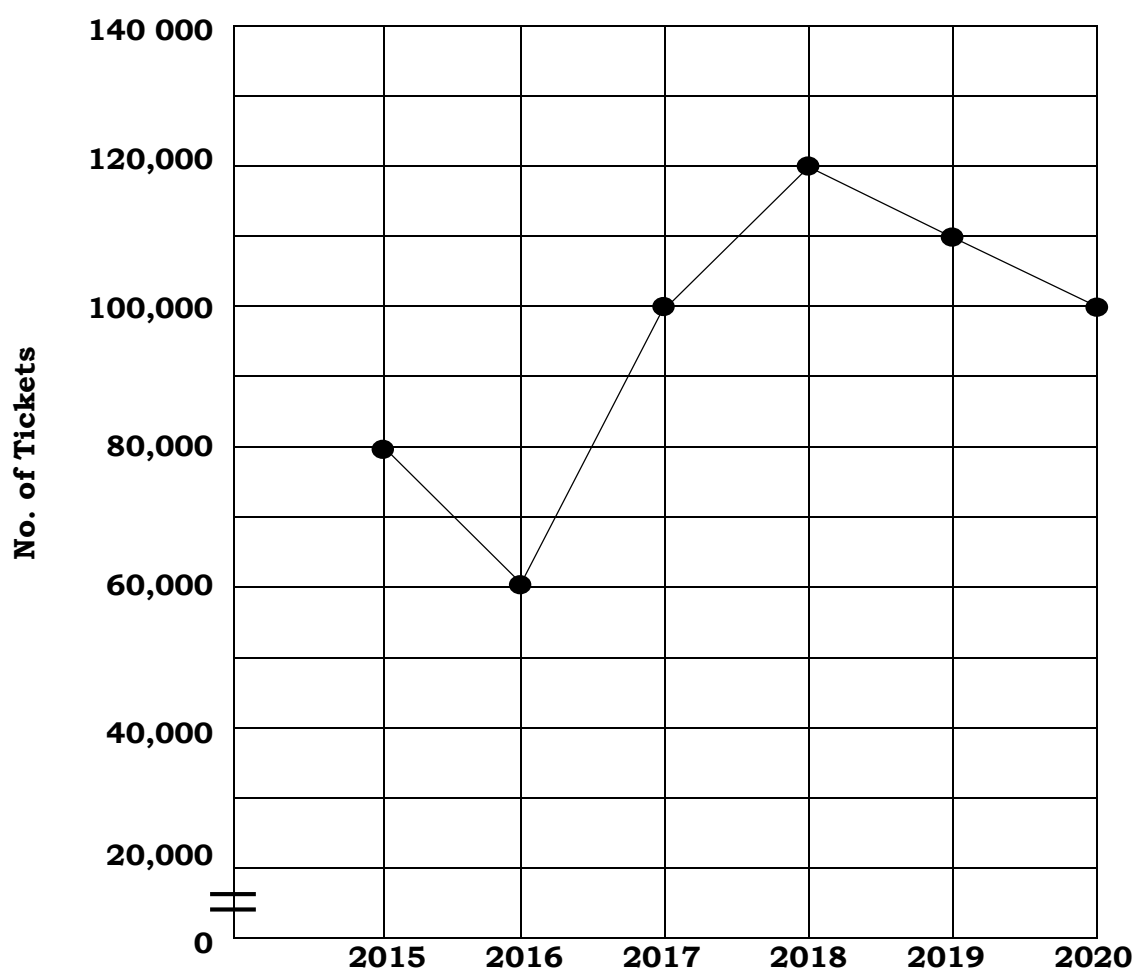
Activity 1: Interpret Me!

Directions: Interpret and study the graph carefully, then answer the questions that follow. Write your answers on a separate sheet of paper.

_____1. How many tickets were sold in 2019?

_____2. In what year was the number of tickets sold lowest?

_____3. In what year was the number of tickets sold highest?

_____4. Did the number of tickets sold increase or decrease from 2019 to 2020?

_____5. How many more tickets were sold in 2020 than in 2015?

Activity 2: Double Check!

Directions: Use the data in the double line graph to answer the questions. Write your answers on a separate sheet of paper.

Nestor's and Alma's Exam Scores
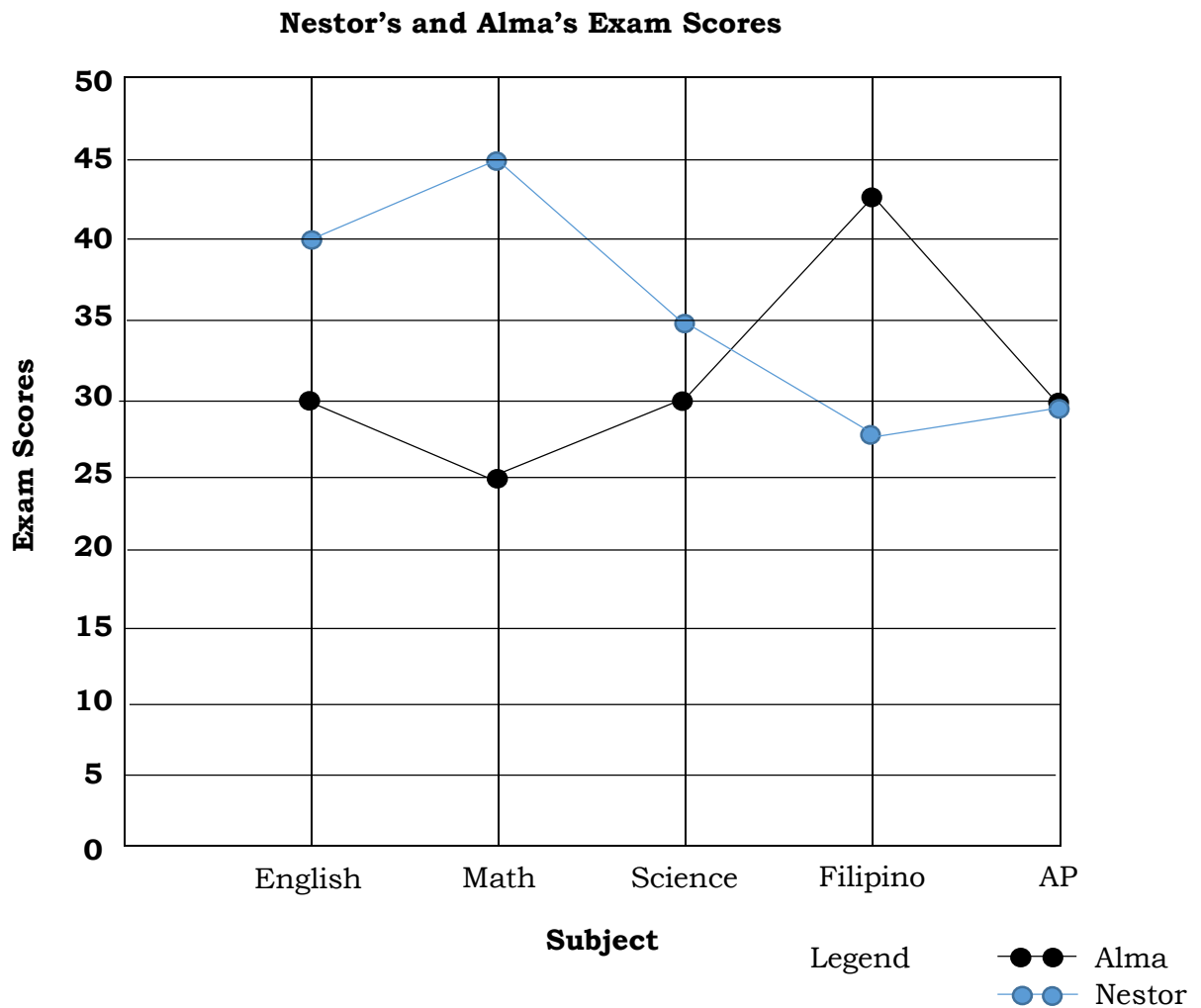
1. What is the graph all about?
2. What do the numbers on the x-axis tell us?
3. In which subject did Nestor and Alma get the same score?
4. In which subject/s did Nestor get higher score/s than Alma?
5. In which subject did Alma get a higher score than Nestor?

Activity 3. Fill It Out

Study the graph below and fill in the blanks. Write your answers on a separate sheet of paper.

Jayson's Quarterly Grades in Mathematics and English
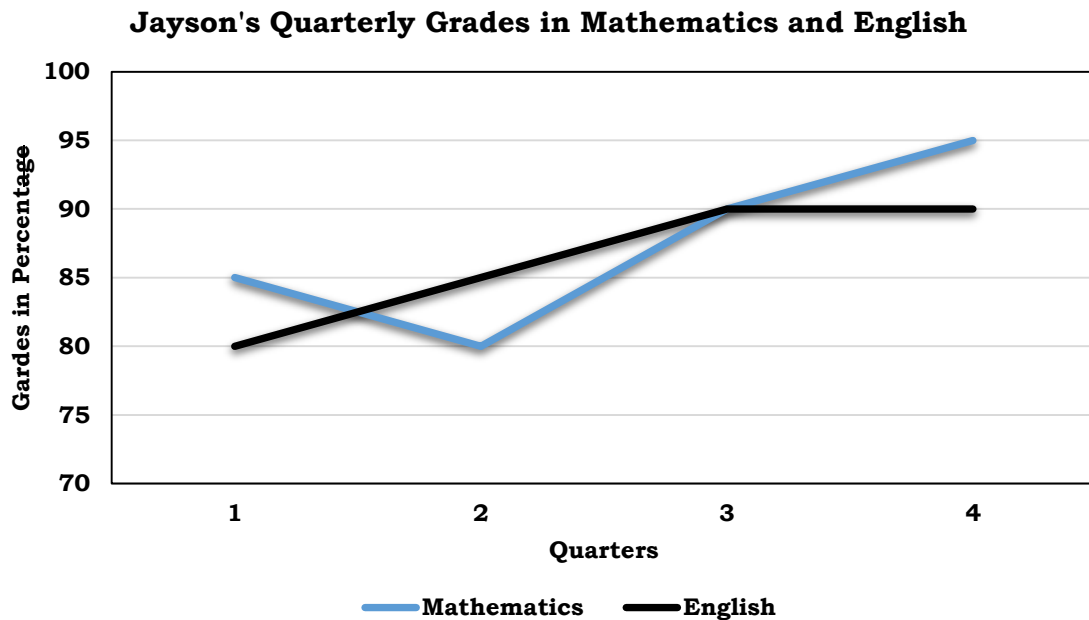
The graph above is all about (1) _____. The data on the y-axis represent the grades in percent–while the data on the x-axis represent the (2) _____.

Jayson's highest grade was (3) _____ percent which he got in the subject (4)_____. In the 4th quarter, his grade in English was (5) _____ percentage points lower than his grade in Mathematics.

What I Have Learned

Fill in the blanks. Write your answers on a separate sheet of paper.

In a line graph, the 1) _____ line or the y-axis shows the values of the second or dependent variable. These values may refer to any type of numerical data such as amounts of money, scores, number of people, temperatures, grades etc.

The 2) _____ line or the x-axis shows the values of the first or the independent variable. These values may refer to categories or classes or points in time, etc.

When a line connecting two points on the line graph is sloping upwards to the right, that indicates that there is an 3) _____ in the value of the dependent variable. When it is sloping downwards to the right, that indicates a 4) _____ in the value of the dependent variable. When it is neither sloping upwards nor sloping downwards, which means it is horizontal, that indicates that there is no change in the value of the dependent variable.

A double line graph uses a 5) _____ to tell the reader which line graph refers to which set of data.

Directions: Interpret the graph to answer the questions that follow. Write your answers on a separate sheet of paper.

Monthly Average Peso – US Dollar Exchange Rate in 2018
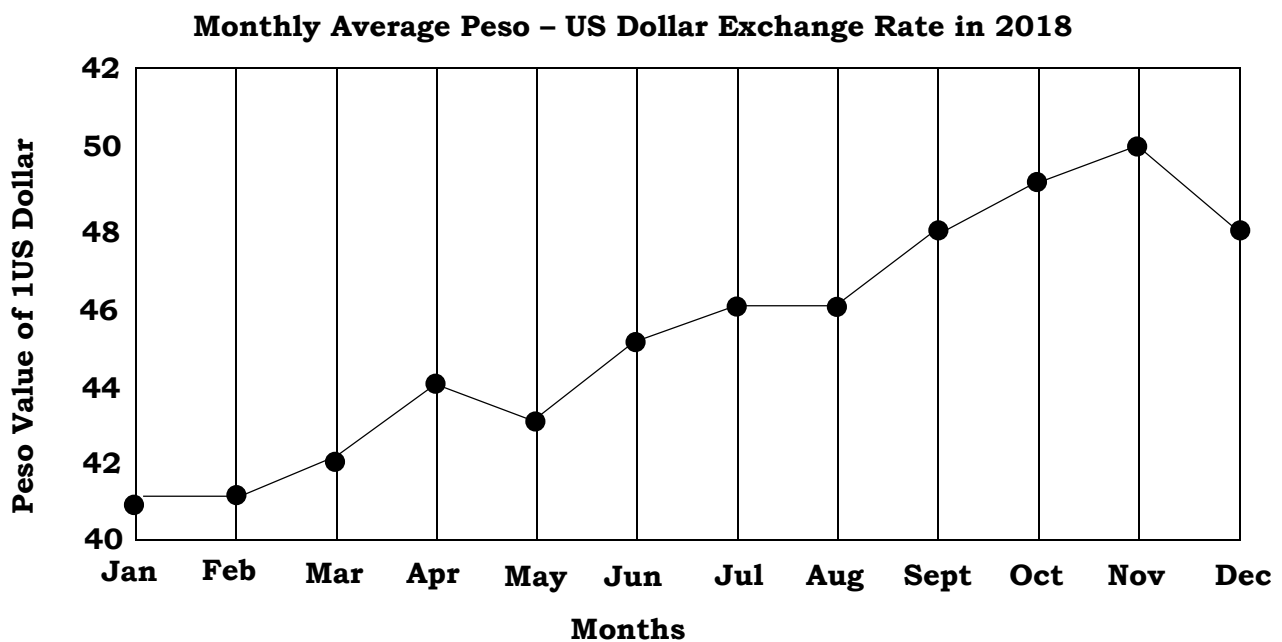
1. What is the graph about?

   _____

2. How much was the least recorded peso value of 1 US dollar?

   _____

3. In what month did the peso have the highest exchange rate?

   _____

4. What was the highest peso value of 1 US dollar during the period?

   _____

5. If your friend had 3 US dollars in April and planned to exchange her dollars for pesos with the money changer in May, what would you have advised him/her then if you knew what would happen?

   _____

Directions: Use the data presented in the double-line graph to answer the questions that follow. Choose the letter that corresponds to the best answer. Write answers on a separate sheet of paper.

Mario's and Marta's Weights (2015 – 2019)
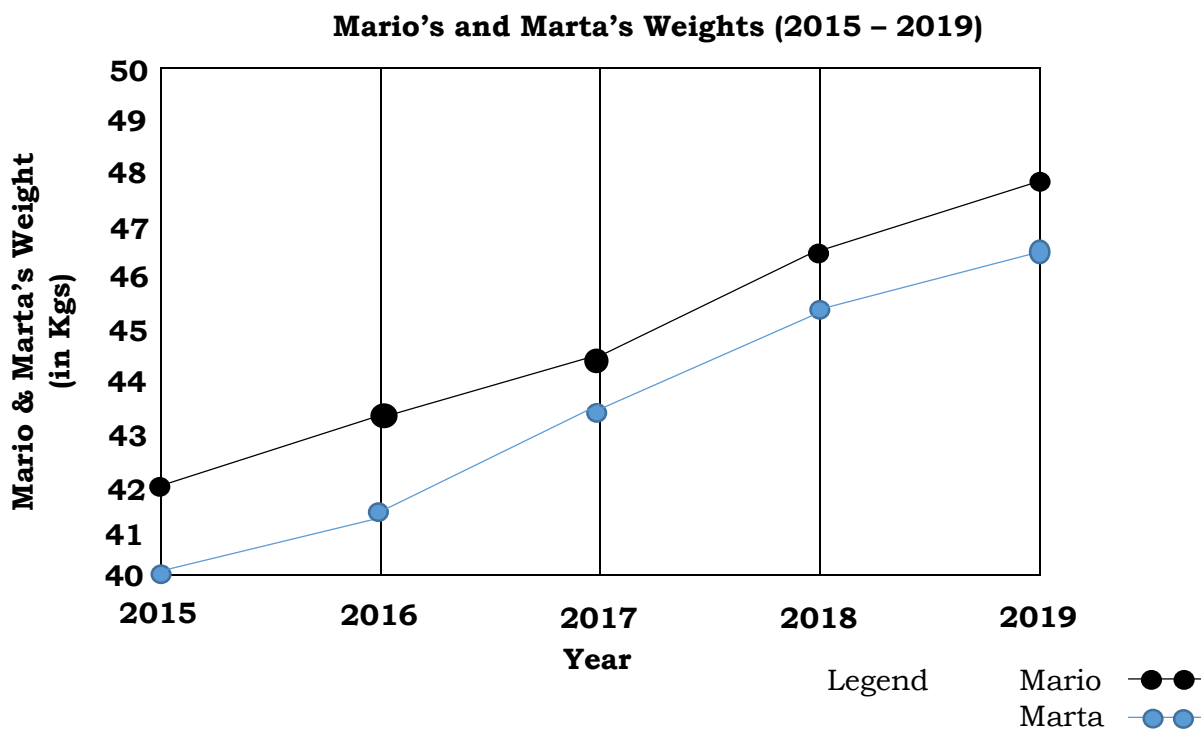
1. What is the title of the graph?
   A. Mario's & Marta's Weights (2015-2019)
   B. Mario's Weights from 2015 to 2019
   C. Marta's Weights (2015-2019)
   D. Weights in 5 years

2. What are being compared in the graphs?
   A. Mario's & Marta's Weights in pounds
   B. Mario's and Marta's Weight in 5 years
   C. Mario & Marta's Weights from 2015-2019
   D. Mario's and Marta's Weights from 2015-2019

3. How many points are in the graph?
   A. 5
   B. 8
   C. 10
   D. 14

4. What is the label of the y-axis?
   A. weight
   B. kilograms
   C. years
   D. height

5. What is the label of the x-axis?
   A. weight
   B. kilograms
   C. year
   D. height

6. How much heavier was Mario in 2019 compared to how he was in 2015?
   A. 5.5 kg
   B. 6.5 kg
   C. 6.0 kg
   D. 6.5 kg

7. How would you describe Mario's weight during the 5-year period?
   A. unchanging
   B. increasing
   C. decreasing
   D. fluctuating

8. Between the two, who was heavier on the average during the five-year period?
   A. Mario
   B. Marta
   C. both
   D. none

9. What was the highest weight recorded by either one during the five-year period?
   A. 50.5
   B. 48.5
   C. 50
   D. 49

10. What was the lowest weight recorded by either one during the five-year period?
   A. 42
   B. 41
   C. 40
   D. 40.5

Additional Activities

You made it! Finally, you're on the last activity. Answer all the questions correctly and you're done with this module!

Directions: Interpret the data presented in the double-line graph and answer the questions that follow. Write your answers on a separate sheet of paper.

Longlong and Dodong's 5-Day Income of Selling Tinapa

Legend: —●—Longlong —●—Dodong
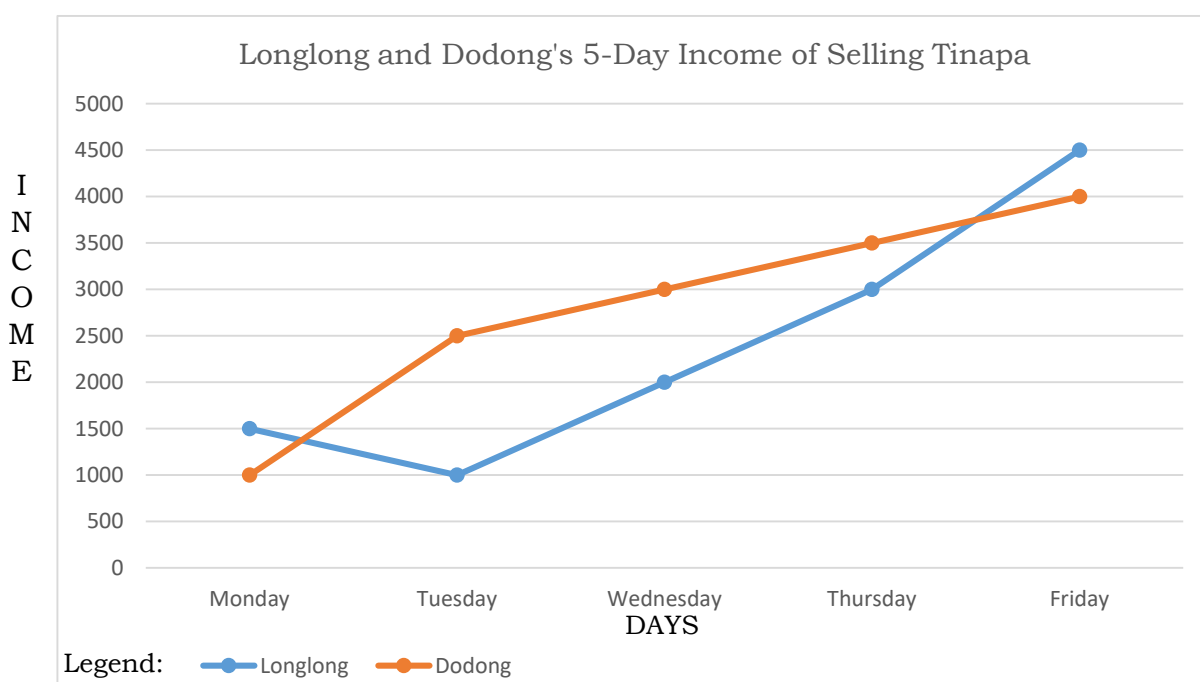
1. What is the double-line graph about?

2. What does the y-axis represent?

3. In which day did Longlong and Dodong earn their highest combined income?

4. What is the difference between their incomes on the fifth day?

5. Who had the higher total income for the period?

![Answer Key icon]

Answer Key

What's More

Activity 1: Interpret Me!

1. 110,000
2. 2016
3. 2018
4. decrease
5. 20,000

Activity 2: Double Check!

1. Nestor and Alma's Exam Scores
2. Subjects
3. Araling Panlipunan
4. English, Math, Science
5. Filipino

Activity 3

1. Jayson's Quarterly Grades in Math and English
2. Quarters
3. 95%
4. Mathematics
5. 5%

What I Can Do

1. Monthly Average Peso - US Dollar Exchange Rate 2018
2. Php 41.00
3. November
4. Php 50.00
5. wait for the exchange rate to go up (ANSWERS MAY VARY)

What I Have Learned

1. vertical line
2. horizontal line
3. increase
4. decrease
5. legend

Additional Activities

1. Longlong and Dodong's 5-Day Income of Selling Tilapia
2. Income
3. Friday
4. Php 500
5. Dodong

Assessment

1. A	6. B
2. D	7. B
3. C	8. A
4. A	9. B
5. C	10. C

What's In

Blooming Sunflowers in Rosa's Garden

What I Know

1. C	6. A
2. A	7. B
3. A	8. B
4. C	9. B
5. C	10. A

References

Lumbre, Angelina P., and Alvin C. Ursua. 2016. *21St Century Mathematics 5 Textbook*. Quezon City: Vibal Group, Inc.

Regional Test Item Bank, *Mathematics 5*